SECTION 118 - PVC PIPELINE

1. GENERAL

This specification covers rigid polyvinyl chloride pipe and fittings, hereinafter called PVC pipe and PVC fittings. The type of materials to be used and the method of application to this system is also covered by this specification.

2. PVC PIPE

SR-PR PVC PIPE: SR (Schedule Rated) - PR (Pressure Rated) PVC pipe shall be extruded Type 1, Grade 1 with a hydrostatic design stress of 2,000 PSI for water at 73.4 F, designated as PVC 1120. Samples of pipe, physical and chemical data sheets, shall be submitted to the Engineer for approval, upon his request, and his approval shall be obtained before pipe is purchased. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be shipped belled-end or coupled-end with one coupling factory applied. Pipe shall have a ring painted around the uncoupled end in such a manner as to allow field checking of setting depth of pipe in the socket. This requirement is made to assist construction superintendents and inspectors in visual inspection of pipe installation. If belled-end pipe is specified, the same ring shall be painted around the male end of the pipe.

The workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures, burst pressures, flattening, extrusion quality, marking and all other requirements of ASTM Standards D-1785 and D-2241 shall be conformed within all respects. Pressure rated PVC pipe shall meet all requirements and shall conform in all respects to the ASTM standard D-2241. Schedule 40 and 80 PVC pipe shall meet all requirements and shall conform in all respects to the ASTM standard D-1785. The PVC pipe shall bear the National Sanitation Foundation (NSF) seal of approval.

Pipe shall be jointed with solvent welds. Field service personnel are available from all pipe manufacturing companies for consultation and recommendations regarding proper installation practices prior to or during the actual installation of the piping system.

Pipe must be delivered to job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or stored as close to the final point of placement as is practical.

3. PVC FITTINGS

Fittings shall be of the same material as the pipe. Preference will be given to the use of extruded fittings. Where molded fittings must be used, they shall be equal to those produced by the Sloane Manufacturing Company. All fittings must be made of NSF approved material.

The dry fit of fittings and coupling sockets must be snug. If the fit is such that it is loose, the pipe and/or fittings should be rejected as faulty because of improper size. Building up the joint to overcome a loose fit with multiple layers of filler solvent will not be permitted.

The 1/2" and 3/4" PVC couplings may be of the molded type. The 1" through 6" PVC

couplings shall be of the extruded type, designed to be interference fit for at least one-half of the socket depth. They shall have a beveled entrance to prevent the wiping off of the solvents on male end while being installed. On 6" and above the male end shall have a 15˚ taper. The following will be considered the minimum socket depth for PVC couplings:

SIZE	SOCKET	SIZE	SOCKET
1/2"	.750"	2-1/2"	2.875"
3/4"	1.000"	3"	3.500"
1"	1.600"	3-1/2"	4.000"
1-1/4"	1.750"	4"	4.000"
1-1/2"	2.000"	5"	5.000"
2"	2.500"	6"	6.000"

PVC Mechanical Joint Adapters for mechanical joint valves, shall be made of Schedule 80 PVC at least 12 inches long. One end shall be built up to an O.D. equal to that required by the mechanical joint fitting.

4. PVC WELDING SOLVENTS

Since PVC welding solvent is engineered and formulated to perform with a given joint design, all solvent must be purchased from a manufacturer of the pipe.

The PVC welding solvent shall be compounded to conform with the socket fit and be such as to assure a weld of maximum strength.

5. INSTALLATION

PVC Pipe is manufactured to withstand normal field handling, but like any pipe, it can be damaged by careless handling. Before unloading make sure enough help and equipment is on hand to properly handle the load. Lay a pipe on a flat surface. If the pipe is to be placed in racks, support the pipe every four feet. Do not throw, whip or drop the pipe.

If the pipe is bundled, use nylon slings, not chains, to unload the bundles. Since PVC pipe is lightweight, it may be unloaded by hand, either by passing over the side or off the truck end. Sliding one length on another is standard practice in unloading PVC pipe; however, the bottom layer should be lifted off to avoid any abrasion from the rough truck bed.

For best results haul the pipe on a trailer which has a flat surface and completely supports the pipe from one end to the other. If hauling pipe any distance other than stringing make sure pipe is secured. Pipe should not be bounced up and down on trailer or truck. Do not allow pipe to drag on ground behind truck or trailer.

Lay pipe, if possible, on the side of the ditch opposite the pile of dirt. Overlap the male end of the pipe approximately half the distance of the socket.

Only competent qualified men at laying plastic pipe shall be employed on the installation phase of the work, and complete suitable equipment necessary for the execution of same is required. Any incompetence observed by the Engineer must be removed at his request, and where improper equipment or lack of same appears to be impairing the quality or speed of the work, such adjustments in same shall be made to the

Engineer's satisfaction.

The pipe, fittings, and valves shall be placed in the trench with care. Under no circumstances shall pipe or other materials be dropped or dumped into the trench. The pipe shall not be dragged in a manner that would cause scratching of the pipe surface. An excessive amount of scratching on the surface of the pipe will be considered cause for rejection.

All interior surfaces of bells and couplings and the male ends of the pipe shall be free of foreign matter. At the termination of pipe laying the open end of the pipeline shall be closed off by a suitable cover until laying operations are resumed.

Any materials not meeting the specifications, or obviously faulty material, shall be rejected by the Engineer. At the option of the Engineer, joints may be cut from the pipeline for inspection. No more than two joints of each pipe size laid shall be cut out in any one day for inspection unless a joint examined proves unsatisfactory.

The trench should be dug so that the PVC pipe will fit the trench without being in a bind. Be sure the bottom of the trench slopes gradually so the PVC pipe will lay on the bottom of trench and not bridge. It is recommended that the trench be wide enough to allow easy installation, rest flat on the trench bottom, and of sufficient width that pipe sides do not touch trench walls.

All trench bottoms should be smooth and free of frozen material, clodded dirt and stones over 1/2" in diameter. Bottom dirt left by the excavator will usually provide the pipe barrel with adequate bedding support. If the trench bottom is free of dirt, soft material can be shaved off the side walls to insure proper pipe barrel bedding. In areas where the trench bottom is hard, a layer of soft backfill material, at least 4" deep, must be provided to insure the pipe barrel is adequately cushioned.

All PVC joints shall be a solvent-weld type made in strict accordance with the manufactures recommendations. Allow sufficient set-up time before disturbing the joint. Allow 24 hours cure time on pipe sizes 5" and below before testing. For sizes 6" and above, joint strength development is very rapid within the first 48 hours. In areas of high ambient temperatures and low humidity, a short cure time period will result in satisfactory joints. The longer cure times are necessary for low temperatures, large pipe sizes, fittings and relative high humidity. Cure time is the time required for the solvent weld joint to reach the pressure rating of the pipe.

After laying of the pipe is completed, it shall be center loaded with backfill to prevent arching and whipping under pressure. Center loading should be done carefully so that joints will be completely exposed for examination during testing, unless conditions warrant complete backfill before testing. PVC pipe must be covered with selected soil that is free of stones and other hard debris such as frozen dirt. This selected soil should be placed into the trench until it provides 6" of cover above the pipe. The trench may now be filled to the top; but hard material should not be dumped on the pipe. Service lines and laterals must be assembled so that no strain is placed on the pipe during or after backfill operations.

6. HYDROSTATIC TESTS

All tests and testing equipment shall be provided by the Contractor at no cost to the Owner. Prior to performance of the test, all air shall be expelled from the pipeline to the

satisfaction of the Engineer. This may be accomplished by means of valves, hydrants or other means.

After the pipe has been laid and center loaded, or backfilled, if conditions warrant complete backfilling, a test pressure of not more than 30% above systems anticipated working pressure may be applied. After the specific pressure has been reached, the pump shall be stopped and all exposed pipe, fittings, valves, joints, and appurtenances examined for leaks. Any visible leaks shall be repaired. The installation will be considered acceptable when the specified test pressure has been maintained for a period of not less than two hours or until the Engineer has inspected and approved the test section, whichever is longer.

PVC PRESSURE PIPE LEAKAGE ALLOWANCE (Max. Gallons per Hour)

Test Pressure, psi	P	50	100	150
Max. allowance, GPH	N X D X P	N X D	N X D	N X D
Solvent-Weld	8000	1140	800	660

N-Number of Joints D - Nominal pipe diameter, inches
P - Test pressure PSI

Leakage Allowance GPH = Gallons per hour

In the event air is admitted to the pipeline after being expelled for the hydrostatic tests, such air shall be removed prior to completion of the system and acceptance by the owner. In no case shall the system be placed into operation before removal of air.